

## **APPENDIX N**

### **REFITTING OF FIRE-CRACKED ROCK FROM THE METATE BLOCK**

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FROM THE METATE BLOCK**

By

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## I. INTRODUCTION

Identification of site formation processes must precede the interpretation of patterning in the archaeological record, in order to distinguish patterns that reflect cultural behavior and patterns that reflect post-depositional formation processes. Crossmending, or refitting, of artifacts is an analytical technique that has been used by many researchers to examine archaeological site formation processes, and a wide variety of artifact classes have been used in this analysis.

Despite the widespread use of this technique, however, the results of crossmend analysis have been widely misinterpreted. The most serious misunderstanding is that fragments of a object entered the archaeological record or came to rest in different places at the same time and that conjoinable fragments therefore establish contemporaneity between archaeological contexts. For example, an assumption is that conjoinable artifacts excavated from different levels or strata demonstrate that these contexts represent a single depositional event. One can readily imagine scenarios that would invalidate this assumption. Using an example from a historic site, some sherds of a broken vessel were deposited in a trash pit immediately after breakage, while others were deposited in a yard midden. During later occupation of the site, more material was added to the midden, and the midden was later redeposited to a new location as a result of a landscaping episode. In this example, crossmending sherds cannot establish that breakage and filling of the trash pit are contemporaneous with the landscaping episode.

Schiffer has pointed out that different classes of artifacts vary significantly in their ability to reflect formation processes through refitting analysis. For example, flakes from a lithic core are subject to a variety of activities associated with manufacture, use, and discard, so that they are not particularly useful for identification of activity areas or depositional units (Schiffer 1987:285-287).

At the Puncheon Run Site, a refit study was done on fire-cracked rock (FCR) to examine formation processes in the Metate block area of Locus 3. The Metate block is an extensive activity area encompassing three distinct FCR clusters, a large grinding stone (the metate), and nearly 8,000 chipped-stone artifacts. In addition to the three FCR concentrations that were identified as features, the area contained varying quantities of FCR in the plowzone and general excavation contexts. Distinct patterning in the 8x10-meter area presumably reflects cultural activities associated with a small camp or processing area, and the refitting of FCR fragments was expected to provide insights into the integrity of the activity area.

## II. METHODOLOGY

The FCR sample from the Metate block is composed of 914 pieces weighing just over 38 kilograms, with a mean weight of 41.6 grams per element. At the start of the exercise, all FCR samples were labeled and arranged by provenience order on tables to approximate their horizontal coordinates in the excavation block. Initial refitting started with FCR of similar material and color originating from the same provenience, then proceeded to those in general proximity, and finally incorporated the entire assemblage. Each refitted cobble was assigned a “crossmend number” for reference. Other data collected included number of fragments, total weight, raw material, and crossmend type. Three types of crossmends were identified based on the direction and slope of the mends: (1) Intra, referring to mends within a common provenience; (2) Horizontal, those within a common excavation level but from different test units; and (3) Vertical, across excavation levels. Summary data are provided in Attachment A.

### III. RESULTS

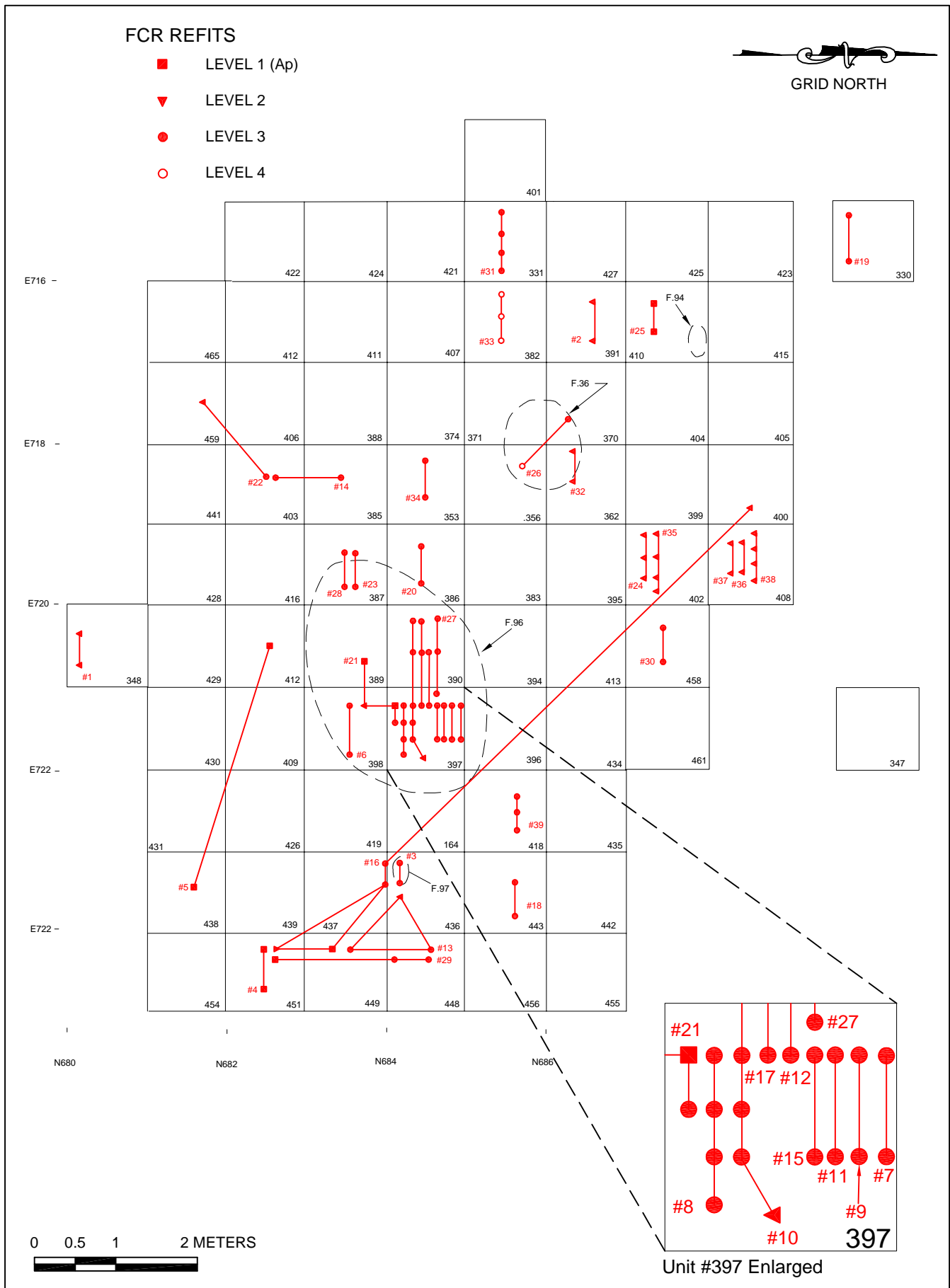
Thirty-nine crossmends were identified, involving 103 individual FCR samples weighing 7,081.2 grams, or 18.6 percent of the sample total. Raw material frequencies consisted of 18 quartz crossmends, 10 sandstone, seven quartzite, three chert, and one conglomerate. Crossmend types consisted of 27 Intra mends, five Horizontal, and nine multi-type. Six of the multi-type mends included a Vertical component. Seven crossmends contained FCR from adjacent test units, with an additional three mends from diagonally tangential units. Crossmends range from two to six fragments, with the most frequent involving two fragments (N=24). Eight crossmends contained three fragments, five contained four fragments, and one each contained five and six fragments. Plate N-1 illustrates examples of the refitted FCR.



**Plate N-1: Fire-Cracked Rock Refit Numbers 10, 13, and 16**

The majority of crossmends (N=20) and individual refitted FCR (N=61) were from Level 3. These crossmends made up about 72 percent of the total refitted sample by weight. An additional six crossmends linked FCR from Level 3 with other levels. Three crossmends were entirely within Level 1 (plowzone), seven were present within Level 2, and one crossmend was contained within Level 4.

Figure N-1 illustrates the links among the refitted nodules. To a large extent, the distribution of refitted FCR matches the location of identified FCR feature clusters. This is particularly true of Feature 96, the large FCR cluster situated near the center of the excavation block. Fourteen crossmends containing 38 FCR were located within Feature 96, with 35 of the individual FCR originating in Level 3. Fully 25 percent of the FCR recovered from Feature 96 was refitted. The crossmends from Feature 96 reflected the matching up of thermally fractured rock from hearth contexts.



**FIGURE N-1: Fire-Cracked Rock Refits, Metate Block**

Crossmends were also made from Feature 97, a small FCR cluster at the eastern edge of the block. Crossmend Nos. 4, 13, 16, and 29, involving 12 elements, lay scattered immediately south and east of Feature 97. The refitting of these crossmends among adjacent units proximal to the feature had the appearance of a dispersed hearth. It is interesting that no crossmends were found for Feature 94, a small FCR cluster near the northwestern corner of the excavation block. A cluster of six cross-mends containing 17 FCR was present along the northern block edge but was not identified as a coherent feature(s) during the field excavation.

Crossmend No. 16 linked five FCR from four test units and three excavation levels, and spans from 7 to 9 meters. Because FCR were not point provenienced, their exact location could not be determined and they may have been present anywhere within the 1x1-meter limits of a test unit. Crossmend No. 16 was the most farflung of the refits, with one element (Cat. No. 98/2/541) a minimum of 5.5 meters from the center of the mend. This outlier may have been picked up for reuse elsewhere as an FCR or a tool, and there is some evidence of pecking on an edge, indicating that it may have been used as a hammerstone.

#### IV. CONCLUSIONS

The overall impression gained from the refitting exercise is of relatively limited artifact migration, as 92 percent (36 of 39) of the crossmends were from the same provenience or adjacent proveniences. There was also little vertical movement evident between refitted FCR. Vertical displacement of relatively heavy elements such as FCR is thought to be caused primarily by floral and faunal agency. The low frequency of vertical refits therefore suggests that the degree of post-depositional disturbance was low. It is interesting that when vertical displacement is present, the upper specimen is much more likely to be the smaller mass. This situation suggests that not all vertical migration is oriented downward as suggested by sherd and debitage size sorting (see Metate block). Rather, it appears that within a certain size threshold ( $\approx 4\text{--}40$  g), artifacts may tend to drift upward through the soil matrix, most likely propelled by processes of freezing and thawing. The upward decrease in FCR quantity and mean size from Level 3 to the surface may reflect this kind of motion (Table N-1).

**Table N-1: Metate Block Fire-Cracked Rock Data**

| <b>Unit Level</b> | <b>Count</b> | <b>Weight</b> | <b>Mean Weight</b> |
|-------------------|--------------|---------------|--------------------|
| 1                 | 210          | 4,720         | 22.5               |
| 2                 | 226          | 7,066.7       | 31.3               |
| 3                 | 427          | 25,500.4      | 59.7               |
| 4                 | 38           | 641.3         | 16.9               |
| 5                 | 8            | 72.1          | 9                  |
| 6                 | 3            | 41.6          | 13.9               |
| 7                 | 1            | 8.9           | 8.9                |
| <b>Total</b>      | 914          | 38,058.9      | 41.6               |

In general, the results of refitting exercises conducted with the FCR sample proved useful in addressing the issue of artifact displacement and depositional integrity of the Metate block. The close juxtaposition of most crossmends and the small quantity of vertical refits suggests that the living surfaces upon which FCR were deposited have not been significantly disturbed and retain the capacity to reflect accurately primary human behaviors.

## REFERENCES CITED

- Schiffer, Michael B.  
1987        *Formation Processes of the Archaeological Record*. University of New Mexico Press,  
              Albuquerque.

## **ATTACHMENT A**

### **FIRE-CRACKED ROCK REFITTING SUMMARY**

## PUNCHEON RUN FCR REFITTING SUMMARY

| Mend No. | Cat No.  | Unit                     | Level/ Feature       | No. of Frags | Material     | Mend Type* | Weight (g) | Notes          |
|----------|--|--------------------------|----------------------|--------------|--------------|------------|------------|----------------|
| 1        | 98/2/289                                       | 348                      | 2                    | 2            | quartzite    | I          | 164.7      |                |
| 2        | 98/2/507                                       | 391                      | 2                    | 2            | sandstone    | I          | 177.3      |                |
| 3        | 98/2/979                                       | 436                      | 3/97                 | 2            | conglomerate | I          | 1179       |                |
| 4        | 98/2/1150                                      | 451                      | 1                    | 2            | sandstone    | I          | 166.7      |                |
| 5        | 98/2/611<br>98/2/976                           | 412<br>438               | 1                    | 2            | quartz       | H          | 413        | dispersed      |
| 6        | 98/2/900                                       | 398                      | 3/96                 | 2            | quartz       | I          | 180.5      |                |
| 7        | 98/2/812                                       | 397                      | 3/96                 | 2            | quartz       | I          | 94.1       |                |
| 8        | 98/2/812                                       | 397                      | 3/96                 | 4            | quartzite    | I          | 112        |                |
| 9        | 98/2/812                                       | 397                      | 3/96                 | 2            | sandstone    | I          | 266.5      |                |
| 10       | 98/2/529<br>98/2/812<br>98/2/825               | 397<br>397<br>390        | 2/96<br>3/96<br>3/96 | 6            | quartzite    | I, H, V    | 480.8      | adjacent units |
| 11       | 98/2/812                                       | 397                      | 3/96                 | 2            | sandstone    | I          | 188.8      |                |
| 12       | 98/2/812<br>98/2/825                           | 397<br>390               | 3/96<br>3/96         | 2            | sandstone    | H          | 300        | adjacent units |
| 13       | 98/2/973<br>98/2/1020<br>98/2/1034             | 436<br>448<br>449        | 2/97<br>3<br>3       | 3            | quartzite    | H, V       | 237.6      | adjacent units |
| 14       | 98/2/692<br>98/2/752                           | 403<br>385               | 3<br>3               | 2            | sandstone    | H          | 224        | adjacent units |
| 15       | 98/2/812                                       | 397                      | 3/96                 | 2            | quartzite    | I          | 106        |                |
| 16       | 98/2/541<br>98/2/979<br>98/2/1026<br>98/2/1049 | 400<br>436<br>449<br>451 | 2<br>3/97<br>1<br>2  | 5            | quartzite    | I, H, V    | 774.4      | dispersed      |
| 17       | 98/2/812<br>98/2/825                           | 397<br>390               | 3/96<br>3/96         | 3            | quartz       | H          | 63.7       | adjacent units |
| 18       | 98/2/1001                                      | 443                      | 3                    | 2            | sandstone    | I          | 191        |                |
| 19       | 98/2/188                                       | 330                      | 3                    | 2            | quartz       | I          | 31.7       |                |
| 20       | 98/2/841                                       | 386                      | 3/96                 | 2            | sandstone    | I          | 72.4       |                |
| 21       | 982/497<br>98/2/527<br>98/2/528<br>98/2/812    | 389<br>398<br>397<br>397 | 1<br>2<br>1<br>3     | 4            | sandstone    | H, V       | 142        | adjacent units |

| <b>Mend No.</b> | <b>Cat No.</b>         | <b>Unit</b> | <b>Level/ Feature</b> | <b>No. of Frags</b> | <b>Material</b> | <b>Mend Type*</b> | <b>Weight (g)</b> | <b>Notes</b>   |
|-----------------|------------------------|-------------|-----------------------|---------------------|-----------------|-------------------|-------------------|----------------|
| 22              | 98/2/692<br>98/2/1191  | 403<br>459  | 3<br>2                | 2                   | quartz          | H, V              | 56.1              | adjacent units |
| 23              | 98/2/911               | 387         | 3/96                  | 2                   | quartz          | I                 | 162.5             |                |
| 24              | 98/2/547               | 402         | 2                     | 3                   | quartz          | I                 | 19.2              |                |
| 25              | 98/2/610               | 410         | 1                     | 2                   | chert?          | I                 | 9.2               |                |
| 26              | 98/2/907<br>98/2/940   | 356<br>370  | 4/36<br>3/36          | 2                   | quartz          | H, V              | 11.7              | adjacent units |
| 27              | 98/2/812<br>98/2/825   | 397<br>390  | 3/96<br>3/96          | 3                   | sandstone       | H                 | 689.1             | adjacent units |
| 28              | 98/2/911               | 387         | 3/96                  | 2                   | quartz          | I                 | 73.2              |                |
| 29              | 98/2/1020<br>98/2/1150 | 448<br>451  | 3<br>1                | 3                   | quartz          | I, H, V           | 187.4             | dispersed      |
| 30              | 98/2/1185              | 458         | 3                     | 2                   | quartz          | I                 | 5.8               |                |
| 31              | 98/2/213               | 331         | 3                     | 4                   | quartzite       | I                 | 98.6              |                |
| 32              | 98/2/346               | 362         | 2/36                  | 3                   | quartz          | I                 | 35.6              |                |
| 33              | 98/2/479               | 382         | 4                     | 3                   | quartz          | I                 | 29.2              |                |
| 34              | 98/2/317               | 353         | 3                     | 2                   | quartz          | I                 | 80.5              |                |
| 35              | 98/2/547               | 402         | 2                     | 4                   | quartz          | I                 | 11.4              |                |
| 36              | 98/2/607               | 408         | 2                     | 2                   | quartz          | I                 | 3.8               |                |
| 37              | 98/2/607               | 408         | 2                     | 2                   | quartz          | I                 | 6.7               |                |
| 38              | 98/2/607               | 408         | 2                     | 4                   | chert           | I                 | 10.1              |                |
| 39              | 98/2/648               | 418         | 3                     | 3                   | chert?          | I                 | 24.9              |                |

\* Mend types: I: Intra, referring to mends within a common provenience; H: Horizontal, those within a common excavation level but from different excavation units; V: Vertical, across excavation levels.